

A Study on Knowledge, Attitude and Practice (KAP) on Anemia and Socio Economic Characteristics of Rural Adolescent Girls in Odisha

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ABSTRACT

Anemia is a critical public health problem in India that affects women and children throughout the lifecycle. The Govt. of India took an effort by launching the programme called “12 by 12 initiatives” addressing the problem of anemia in adolescents. Under Rajiv Gandhi Scheme for Adolescent Girls-SABALA programme initiated in 2011, adolescent girls are being received weekly supplementation of iron folic acid tablets and biannual de-worming tablets. Recently another remarkable initiative to improve nutritional outcomes for children, pregnant women and lactating mothers, “Poshan Abhiyaan” was launched in March 2018. Despite all these programmes, the prevalence of anemia among women and Adolescent Girls is alerting. Therefore, the current study focused on knowledge, attitude and practice (KAP) on anemia and socio economic characteristics of Rural Adolescent Girls’ in Odisha. A one group pretest and post test design was adopted for conducting the study. 508 (30% of the population) girl students from one school and two (+2) colleges in Banki were selected as the sample for the study. Information on socio-demographic profile, history of worm infestation, menarche, menstrual problems, personal hygiene and consumption of green leafy vegetables, diet history were collected through the questionnaire.

KEYWORDS: Anemia, Knowledge, Attitude, Practice, Socio economic characteristics

Height and weight were measured along with hemoglobin status. Paired t test was used to know the difference between pretest and post test. ANOVA for Significant difference between the sources of information and gain score of KAP, correlation coefficient between KAP, regression analysis is used to know the relationships between multiple variables of the study. The present study reflects that the difference in the mean score of the Knowledge, attitude and practice are higher after the post test than the pretest scores. Hence, it is interpreted that the planned nutrition education programme on Anemia was very effective in changing the knowledge, attitude and practice among the rural adolescent girls in a positive direction. There is significant difference between Age group, Age at menarche, family type, mother’s educational status, personal hygiene and sanitation facilities and the gain score of knowledge, attitude and practice. There is a significant difference between the family income and the gain score of the

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knowledge, attitude and practice of anemia at the 0.05 level of significance. Thus, it is concluded that the demographic variables would have influence over the knowledge, attitude, and practice on anemia.

INTRODUCTION

Nutritional anemia is an important public health challenge in India. It has devastating effects on health, physical and mental productivity affecting quality of life, particularly among the vulnerable. Urgent action from all concerned is called for since Anemia could translate into significant morbidities for affected individuals and consequent socio-economic losses for the country.

The widespread prevalence of anemia in adolescent girls in India is gaining increasing recognition. Anemia among girls (Hb <12 g%) and boys (Hb <13 g%) is alarmingly high as per the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey. The report of NHFS-3 revealed over 55 per

cent of adolescent girls are anemic. Percentage prevalence of anemia among adolescent girls in the age group 15–19 years and in the older age group 20–29 years remains almost stagnant at 55.8 per cent and 56.1 per cent respectively.

Global anemia prevalence in 2010 was 32.9%; causing 68.36 million years lived with disability (Kassebaum et al, 2010). A higher proportion of women in 15-59 years age group were anemic than men (WHO, 2001). The United Nations Children's Fund (UNICEF) reported that 56% of adolescent girls (AGs) in India were anemic. Adolescence is the transition of a child to become an adult, during which there are increased physiological needs of iron due to the growth spurt, expansion of the lean body mass, total blood volume and the onset of menstruation (Delisle H.,2005).

Iron requirements are increased during adolescence reaching a maximum at peak growth and remaining almost as high in girls after menarche to replace menstrual losses. Infectious diseases and parasitic infections enhance the demand for increased iron need due to mal-absorption in developing countries. The occurrence of anemia is high not only among undernourished persons but also in normal and over-nourished individuals. Incidence of anemia among adolescent girls is high due to demand for iron requirement. The demand may be due to menstrual loss, poor food choice, exclusion of green leafy vegetables and iron rich foods, mal-absorption due to inhibitors such as phytate and tannins, iron bioavailability, chronic blood loss due to infection such as malaria and hookworm infestations (Kishore, 2006).

The school based nutrition awareness strategy would have greater impact at rural areas. The school health nutrition program is one approach to community health education that is effective in change of knowledge, attitude and practices to prevent nutritional diseases and favour healthy lifestyle (Sujatha k., 2016). There was a significant improvement in the nutritional knowledge of the subjects after nutrition education. Schools can be an effective and efficient medium to influence the health of school children. Similar reports were also given by Sajjan, (2008). The intervention measures are more effective when they are integrated with other approaches such as improvement of nutritional practices, fortification, dietary modification, infection control, public health measures and income generation programmes. Obstacles related to the building of iron stores during pregnancy provide a strong logic for nutrition education concerning the iron status of women before pregnancy and

adolescents are the future mothers and their health may affect the upcoming generation. Yet, adolescents remain a largely untouched and hard –to reach population, in which the needs of adolescent girls in particular, are often neglected in our society. There is lack of appropriate knowledge and attitude regarding conscious healthy eating among adolescents and consequent unhealthy eating behavior. The majority of adolescents can be reached effectively through educational institutes, which is an appropriate place for nutrition education. Therefore the present study focuses “A study on Knowledge, attitude and practice (KAP) on Anemia and Socio Economic Characteristics of Adolescent Girls’ in Rural Odisha.” The objective of the study was to determine the to determine the association between the selected demographic variables such as the age of the student, age of menarche, family income, type of family, mother’s educational status, consumption of green leafy vegetables, personal hygiene and sanitation facilities and the level of KAP among the adolescent girls. It was hypothesized that there is no significant association between the selected demographic variables and the level of knowledge, attitude and practice before and after planned nutrition education program on anemia.

Materials and Methods

An exploratory approach seems to be suitable as the present investigation aims to assess the effectiveness of the planned nutrition education program on anemia among the rural adolescent girls of Odisha.

A one group pretest and post test design is adopted for conducting the study. In this study, the researcher had done the pre test for the selected adolescent girls and had controlled the independent variable i.e. planned nutrition education programme on anemia which was administered to the same group of adolescent girls. Then the post survey was conducted after 6 months. Finally the association of the planned nutrition education programme on anemia on dependent variable i.e. the knowledge, practice, attitude and belief was computed by the post test.

The research design is represented as follows:

01 x 02

01 - Pre - survey for the assessment of level of knowledge, practice and attitude towards anemia.

x - Planned nutrition education programme on anemia.

02 - Post survey for the assessment of level of knowledge, practice, and attitude towards anemia.

The study was conducted in Govt. Girls High School, +2 College of (Rani Suka Dei) and Banki College of Banki Subdivision of Cuttack District. The reason for selecting these school and colleges is the availability

of the samples, easy access and feasibility, to educate the girls about the reproductive health.

The researcher has undertaken a pre- survey to understand the existing condition of anemia and its practices. Then, a planned teaching programme (video programme) on anemia was conducted and after a gap of 6 months, re-survey was undertaken to know the association of the planned nutrition education programme on anemia.

The total population of all adolescent girls in the age group of 12 years to 17 years was 1694. Out of 1694, 508 (30 percent) adolescent girls who fulfilled the inclusion criteria were spotted and they purposively selected as sample cases for the present study.

Structured questionnaire was developed after an extensive review of literature and discussion with experts in order to select the most suitable and appropriate assessment tool for the data collection.

Section A of the Questionnaire deals with demographic profile, anthropometric data, clinical and biochemical assessment, dietary information, menstrual history and history of past illness and diet history and 2nd part of the questionnaire was the nutrition education intervention to assess knowledge, attitude and practice of adolescent girls about nutrition related to anemia was used for collection.

Scoring Keys

Section A: The Demographic profile, anthropometric data, clinical and biochemical assessment, dietary information, menstrual history and history of past illness of the adolescent girl was coded and there by subjected for statistical analysis.

Section B: Questionnaire was used to assess the Knowledge and attitude of the adolescent girls on anemia. It has 10 questions from each aspect and for every correct answer 1 mark was awarded and for every incorrect answer '0' mark was awarded. Therefore the maximum mark awarded for the questions was 10 marks.

Following decisions were made about the end of knowledge and attitude based on the total number of marks scored by the each sample cases.

0-50 percent - Inadequate knowledge, 51-75 percent - Moderately adequate knowledge, and 76-100 percent - Adequate knowledge

Attitude:

0-50 percent - Unfavorable attitude, 51 percent -75 percent - Moderately favorable attitudes and 76 percent -100 percent - Favorable attitudes

Practice

5 point rating scale was used to assess the practice of anemia among the adolescent girls. Each item was awarded maximum of 5 marks and minimum of 1 mark. The scoring of each item was made as follows:-

Never- 1, rarely -2, Sometimes- 3, Often -4, Very often- 5

Data collection was carried out at the school and college premises during working days of the school with due permission from respective school and college Heads. Finally all eligible students in the class were voluntarily recruited for the study with continuous interaction and motivation through discussion. Intervention was divided into four sessions containing, lectures by nutrition experts on "simple definition of anemia, causes, risk of anemia, consequences dietary habits, sources of iron rich foods. Vitamin C rich food for iron absorption etc, e-learning module videos on Anemia Developed by ICMR- NIN under "Poshan Abhiyaan", Government of India. Each session lasted for approximately 45 minutes. Power point presentations and videos were used to present the educational material, and brochures were distributed at the end of the session. The adolescent girls were instructed to practice the knowledge as shown in the nutrition education programme. Then, survey was conducted after a gap of 6 months with the same sample cases.

Descriptive statistics (mean and standard deviation) was used to represent the basic distribution of various parameters. Paired t test was used to know the difference between pretest and post test. ANOVA (Duncan Multiple Range Test (DMRT), Correlation Coefficient between KAP, regression analysis is used to know the association between multiple variables of the study.

Results

Prevalence of Anemia among the Adolescent Girls

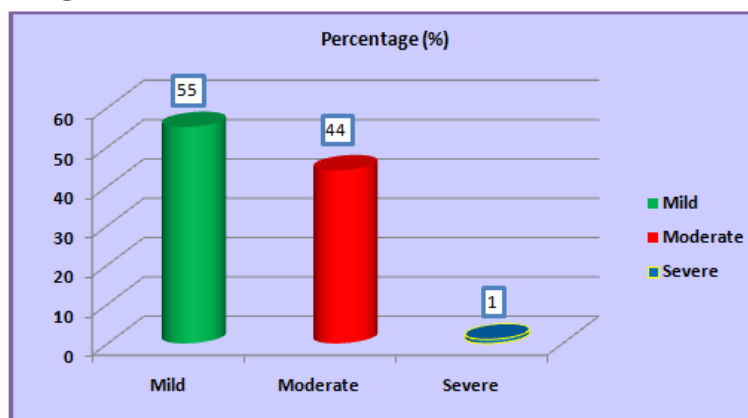


Fig-1: Distribution of respondents according their anemia status

Fig-1 shows grades of anemia among the respondents. The grades of anemia were categorized according to WHO (2011) as severe, moderate and mild anemia. The mean hemoglobin levels of the subjects were found to be 9.65 g /dl. Majority of women (55%) had mild anemia and only 1 percent of the respondents had severe anemia.

Level of Knowledge, Attitude and Practice of the Respondents

Fig-2, Fig-3 and Fig-4 indicates the knowledge, attitude and practice scores of anemia among the respondents in the pretest and post test of nutrition education intervention. The mean score on knowledge on anemia of the respondents is 5.27 with standard deviation of 1.87 before the planned nutrition education programme. After the planned teaching programme the mean score is 8.22 with standard deviation of 1.18.



Fig-2: Meanvalue and SD of Respondent's knowledge

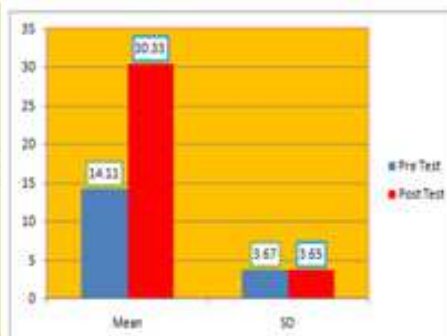


Fig-3: Meanvalue and SD of Respondent's attitude

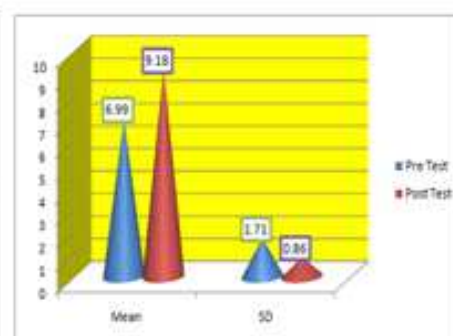


Fig-4: Meanvalue and SD of Respondent's practice

The above analysis underlines the fact that the planned nutrition education programme on anemia was very effective in increasing the knowledge of the girls about anemia practices and menstrual hygiene.

Based on this finding, we can assume that adolescent girls have learnt good hygienic practices and developed a good confidence in managing the event of anemia.

The mean score of attitude towards anemia of the respondents is 14.11 with standard deviation of 3.67 before the planned nutrition education programme and after the planned nutrition education programme the mean score is 30.33 with standard deviation of 3.65. The above analysis indicates that there was a positive change in the attitudes of the girls towards the anemia after the introduction of planned nutrition education programme on practices regarding anemia. Girls were consciously choosing their food and make correction in their dietary habits.

Further that the mean score of practice on anemia of the respondents is 6.99 with SD of 1.71 before the planned nutrition education programme and after the planned nutrition education programme the mean score is 9.18 with SD of 0.86. This analysis shows that proper anemia practices among adolescent girls have increased after the introduction of planned nutrition education programme on anemia-such as , its causes, risk, consequences, dos and don'ts, iron rich food sources, role of vitamin C, blood forming nutrients etc. Based on this finding, it is concluded that the planned nutrition education programme on anemia was very effective and hence, it is suggested that similar type of planned educational programme on nutrition should be introduced in educational institutes where poor students are studying.

Table-1: Pre-test and Post-test and KAP of the Respondents

KAP	Pre test		Post test		t value	P value
	Mean	SD	Mean	SD		
Knowledge	5.27	1.87	8.22	1.18	53.05	0.000**
Attitude	14.11	3.67	30.33	3.65	89.59	0.000**
Practice	6.99	1.71	9.18	0.86	37.26	0.000**
Overall Score	26.37	4.50	47.73	4.13	107.56	0.000**

Note: ** denotes significance at 0.05 percent level

The table- 1 shows that P value is less than the table value; the null hypothesis is rejected at the 0.05 level of significance. Hence it is concluded that there is a significant difference between the pretest and post test and KAP gained on anemia.

It is also seen that the mean scores of the Knowledge, attitude and practice are higher after the post test than the pre test scores. Hence, it is interpreted that the planned nutrition education programme on anemia was very effective in changing the knowledge, attitude and practice of anemia among school girls in a desired direction.

Demographic characteristics and KAP (Knowledge, Attitude, practice) of the respondents on Anemia **N=508**

Gain score on KAP	Age (in years)	Mean	SD	F value	P value
Knowledge	12-13	2.89	1.347	0.673	0.569
	14-15	3.01	1.24		
	16-17	2.83	1.08		
Attitude	12-13	14.29	4.52	15.358	0.000**
	14-15	16.67b	3.47		
	16-17	17.52b	4.08		
Practice	12-13	2.52	1.35	4.850	0.002**
	14-15	2.13ab	1.27		
	16-17	1.90 ^a	1.31		
Overall Score	12-13	19.70	5.07	8.559	0.000**
	14-15	21.81b	3.98		
	16-17	22.25b	4.27		

Note: Different alphabet between age group denotes significant at 0.05 level of significance using Duncan Multiple Range Test (DMRT).

Since P value is less than table value, null hypothesis is rejected at the 0.05 level of significance therefore we can assume that there is a significant difference between the age and the gain score of attitude, practice and overall gain score of anemia.

Based on this data it is found that girls, when they grow older they gain more knowledge on anemia and maintains proper hygienic, dietary practices as their level of understanding becomes more rapid as they progress in age.

Table-2 Mothers' Educational Status and Gain Score of KAP on Anemia**N=508**

Gain score of KAP	Mother Educational Status	Mean	SD	F value	P value
Knowledge	Illiterate	2.92	1.30	0.061	0.993
	Primary	2.98	1.24		
	Middle	2.94	1.15		
	High School	2.95	1.27		
	HSc	2.86	1.42		
Attitude	Illiterate	15.71	4.02	1.066	0.372
	Primary	16.15	3.95		
	Middle	16.44	4.52		
	High School	16.69	3.36		
	HSc	17.05	3.91		

Practice	Illiterate	2.13	1.235	0.241	0.915
	Primary	2.24	1.39		
	Middle	2.24	1.28		
	High School	2.11	1.38		
	HSc	2.09	1.27		
Overall Score	Illiterate	20.76	4.42	0.920	0.452
	Primary	21.36	4.28		
	Middle	21.62	5.02		
	High School	21.75	3.82		
	H Secondary	22.00	3.78		

This table-2 shows that P value is greater than table value; null hypothesis is accepted at 0.05 level of significance with respect to Knowledge, Attitude and Practice on anemia. Hence there is no statistically significant difference between mother educational status and gain score of knowledge, attitude, and practice anemia. According to DMRT score, there is statistically a significant difference in attitude of mothers who were illiterate than the literate mothers who have studied up to higher secondary, high school, middle school and primary school.

Difference between Family Income and Gain Score of KAP on anemia

Table-3: family Income and KAP scores of the respondents

N=508

Gain score of KAP	Family Income(Rs)	Mean	SD	F value	P value
Knowledge	Below 3000	2.92	1.29	0.274	0.760
	3001-5000	3.00	1.17		
	Above 5001	2.89	1.20		
Attitude	Below 3000	16.20	3.88	0.540	0.583
	3001-5000	16.10	4.20		
	Above 5001	16.79	4.49		
Practice	Below 3000	2.09	1.29	2.767	0.064
	3001-5000	2.38	1.33		
	Above 5001	2.11	1.34		
Overall Score	Below 3000	21.21	4.21	0.444	0.642
	3001-5000	21.48	4.56		
	Above 5001	21.79	5.32		

The above table-3 reveals that the P value is greater than calculated value and null hypothesis is accepted at the 0.05 level of significance with respect to knowledge, attitude and practice on anemia. Hence there is no significant difference between family income and gain score of knowledge, attitude, and practice of menstrual hygiene.

Based on the above findings it is assumed that most family expends only to a minimal amount towards nutrient rich foods practices. Generally they consume the food according to their taste, liking and availability. Since it is a very confidential concern and not much discussed with other family members, girls would hesitate to meet the demands of nutrition practices.

Table- 4 Difference between Type of Family of the Respondents and Gain score on KAP

Gain Score on KAP	Type of family	Mean	SD	t value	P value
Knowledge	Nuclear family	2.90	1.22	1.495	0.139
	Joint family	3.10	1.32		
Attitude	Nuclear family	16.31	4.17	0.968	0.333
	Joint family	15.89	3.58		
Practice	Nuclear family	2.14	1.32	1.446	0.149
	Joint family	2.35	1.28		
Overall Score	Nuclear family	21.36	4.52	0.039	0.969
	Joint family	21.34	4.18		

Since P value is greater than the table value, null hypothesis is accepted at the 0.05 level of significance. Hence we can assume that there is no significant difference between nuclear type of family and joint type of family and gain score of KAP.

From the above t test, it is found that neither the joint family nor the nuclear family has changed the gain score on Knowledge, attitude and Practice.

Table-5 Correlation Coefficient between KAP of Gain Score on anemia

	Knowledge	Attitude	Practice
Knowledge	1.000	0.095*	0.149**
Attitude	0.095*	1.000	0.082
Practice	0.149**	0.082	1.000

The table-5 shows the relationship between the planned teaching programme on menstrual hygiene (X) and KAP (knowledge, attitude and practice) gained on anemia practices (Y). To establish the relationship between these two, correlation coefficient is used. According to the statistical calculation of correlation co-efficient of X on Y is 0.095 which means a strong positive association between X and Y. That is, the planned teaching programme on anemia practices influenced the KAP gain score on anemia.

In the present study the statistical analysis of relationship among these variables multiple correlations and the equation describing such relationship known as the multiple regression equation was used. The dependent variable is KAP Gain score and designated with Y and independent variables are Age group, Age of Menarche, occupation, Type of Family, Mother Educational status, Family Income, Source of knowledge, Consumption of green leafy vegetables, personal hygiene and sanitary facilities considered (X) in the study.

Dependent variable: KAP Gain score (Y)

Independent variable: Age group in years (X1), Age of Menarche (X2), Family Income (X3), Type of Family (X4), Mother Educational status (X5), Occupation (X3), Source of knowledge (X7), Consumption of green leafy vegetables (X8), Personal hygiene sanitary facilities(X9).

Multiple r value: 0.338

r^2 (r square) value: 0.115, Adjusted r^2 (r square) value: 0.085

F value: 3.822, P value: 0.000**

Table-6

Variables	Unstandardized Co - efficient	SE of B	Standardized Co-efficient	t Value	LOS
X1	0.657	0.304	0.139	2.165	0.031
X2	0.891	0.450	0.128	1.979	0.049
X3	1.209	0.512	0.141	2.361	0.019
X4	0.722	0.633	0.068	1.141	0.255
X5	0.568	0.235	0.145	2.147	0.016
X6	0.125	0.377	0.019	0.330	0.741
X7	0.226	0.237	0.056	0.955	0.341
X8	0.112	0.408	0.016	0.275	0.783
X9	0.594	0.546	0.064	1.089	0.277
Constant	21.311	2.549	-	8.361	0.000

The multiple Correlation coefficients 0.338 measure the degree of relationship between the actual values and the predicted values of KAP gain score. Because the predicted values are obtained as a linear combination of Age group (in years) (X1), Age of Menarche (X2), Occupation (X3), Type of Family (X4), Mother Educational status (X5), Family Income (X6), Source of knowledge (X7), consumption of green leafy vegetables (X8), the coefficient value of 0.338 indicates that the relationship between KAP gain score and the Independent variables is quite strong and positive.

The coefficient of determination r- Square measures the goodness-of-fit of the estimated sample regression plane (SRP) in terms of the proportion of the variation in the dependent variables explained by the fitted sample regression equation. Thus, the value of r square is 0.115 simply means that 11.50 percent of the variations in KAP gain score is explained by the estimated SRP that uses independent variables and r square value is significant at the 0.05 level of significance.

The multiple regression equation is

$$Y = 21.311 + 0.657 X_1 + 0.891 X_2 - 1.209 X_3 + 0.722 X_4 + 0.568$$

$$X_5 + 0.125 X_6 + 0.0226 X_7 + 0.113 X_8 - 0.594 X_9$$

Table-7 Regression Analysis of Knowledge Attitude and Practice with Related Background Variables among the Respondents

Variables	Unstandardized Co- efficient	SE of B	Standardised Co- efficient	t value	LOS
Age group (in years) (X1)	0.657	0.304	0.139	2.165	0.02
Age of Menarche (X2)	0.891	0.450	0.128	1.979	0.049
Family Income (X3)	-1.209	0.512	-0.141	2.361	0.019
Educational Status (X5)	0.568	0.235	0.145	2.147	0.016

The above table reveals that there was a significant relationship with age group in years, Age of Menarche, family income, Mothers Educational Status at the level of $p < 0.05$ with a 'r' value of 0.02, 0.049, 0.019, 0.016 respectively.

Based on the findings we can conclude that there is a correlation between the age group and level of knowledge, attitude and practice. Age is an important factor to attain knowledge. When age inter-relates with their experience on anemia, there is a positive effect on gaining knowledge, attitude and practice on personal hygiene.

The next variable which had a positive correlation was the age of menarche. As the age of menarche of the adolescent girls increased there was a noticeable change ahead in knowledge, attitude and practice on personal hygiene.

Family income also has a positive correlation of KAP on anemia. Family income adds on to the other financial factors to maintain hygienic, nutrition practice. Income of family practices in regard to health is a promoting factor to maintain health on the level of knowledge, attitude and practice.

Mothers' educational status found to be positively correlated with the level of knowledge, attitude and practice. Since mothers' are the key person to impart information regarding the issues of a girl. Henceforth if a mother is educated she could promote most healthy practices to her daughter as compared with the mothers who have not educated.

Table-8 Association between the Age group (in years) and level of gain in KAP

Age group (in years)	Level of gain in KAP			Total	Chi – square Value	P value
	Low	Moderate	High			
12-13yrs	53	59	18	130	26.163 (df = 4)	0.000***
14-15 yrs	54	164	62	280		
16-17 yrs	16	51	31	98		
Total	123	274	111	508		

df (degree of freedom) = 4, calculated χ^2 value = 26.16 for the above data.

Table χ^2 value = 9.488 for the df = 4 at 0.05 level of significance.

The above table explains the association between the age and the level of KAP gain score on anemia. Since the calculated χ^2 value is greater than the table χ^2 value, the null hypothesis is rejected. Therefore, it is interpreted that there is significant association between the age and the level of KAP gain score on anemia after the post – test. We can also state that the planned nutrition education programme on anemia was very effective in changing the KAP on anemia in a positive way.

Table-9 Association between the Type of Family and level of gain score in KAP on Anemia

Type of Family	Level of gain in KAP			Total	Chi – square Value	P value
	Low	Moderate	High			
Nuclear	98	211	88	397	0.632 (df = 2)	0.729
Joint	28	62	21	111		
Total	126	273	109	508		

df = (2-1)(3-1) = 2, calculated χ^2 value = 0.63

Table χ^2 value = 3.219 for df = 2 at 0.05 level of significance

Since the calculated χ^2 value is lesser than the table χ^2 value, the null hypothesis is accepted. Based on the χ^2 test it is concluded that there is no association between the type of family and the level of gain score of KAP on anemia. Hence, it is interpreted that the planned nutrition education programme on anemia has not influenced the gain score of KAP on anemia among adolescent girls.

Table-10 Association between the Educational Status of the Mothers and the Level of Gain Score in KAP on Anemia

Mother Educational Status	Level of gain in KAP			Total	Chi – square Value	P value
	Low	Moderate	High			
Illiterate	40	66	22	128	11.16 (df = 8)	0.193
Primary	39	92	32	163		
Middle	32	60	36	128		
High School	10	44	13	67		
HSc	4	12	6	22		
Total	125	274	109	508		

df = (5-1)(3-1) = 8, calculated χ^2 value = 11.16

Table χ^2 value = 15.507 for df = 8 at 0.05 level of significance

Since the calculated χ^2 value is greater than the table χ^2 value, the hypothesis is rejected. It is concluded that there is a significant association between the educational level of the mothers and the level of gain score of KAP on anemia. Therefore, it is explained that the literacy level of the mothers influenced the KAP score on anemia.

Table-11 Association between the Family Income and level of Gain Score in KAP on Anemia

Family Income	Level of gain in KAP			Total	Chi – square Value	P value
	Low	Moderate	High			
Below 3000	72	151	62	285	9.692 (df = 4)	0.046*
3001 -5000	37	104	35	176		
Above 5001	14	17	16	47		
Total	123	272	113	508		

df = (3-1)(3-1) = 4, calculated χ^2 value = 9.69

Table χ^2 value = 9.488 for df = 4 at 0.05 level of significance

Since the table χ^2 value is lesser than the calculated χ^2 value. It can be assumed that there is a significant association between the family income and the level of gain in KAP. Hence the null hypothesis is rejected. Hence, it can be inferred that the family income influence the level of gain in Knowledge, attitude and Practice among adolescent girls.

Discussion

Health and nutritional conditions are mainly the result of socio economic characteristic of the population itself. In the present study, there is a significant difference between the age group and the gain score of knowledge, attitude and practice and hence, there is no significant difference between Age of menarche, type family, mother's educational status, personal hygiene and sanitation facilities and the gain score of knowledge, attitude and practice. There is a significant difference between the family income and the gain score of the knowledge, attitude and practice of anemia at the 0.05 level of significance. Thus, it is concluded that the demographic variables would have influence over the Knowledge, attitude, Practice on anemia.

As Knowledge is the base for the practice, the investigator assessed the level of knowledge on

anemia among the adolescent girls. It is also considered as one of the background variable, because it influences the outcome. If the adolescent girls have inadequate knowledge on anemia, they would be at the risk of getting the several other etiological and predisposing factors like chronic intestinal worm infestation and mal-absorption. Knowledge will help to develop the conscious dietary habits to keep themselves healthy. The findings of the present research reveal a significant difference between the Age and the gain score level of Knowledge, Attitude and Practice and the f values were calculated as 0.673, 15.358 and 4.850. Since P value is less than 0.01, null hypothesis is rejected at the 0.05 level of significance with respect to attitude and practice. Hence, there is a significant difference between the age group and the gain score of attitude, practice.

The type of family and the gain score level of knowledge, attitude and practice was assessed and the t values were calculated as 1.495, 0.968 and 1.446. Since P value is greater than 0.05, null hypothesis is accepted at 0.05 percent level of significance. Hence, there is no significant difference between the nuclear family and Joint family with respect to gain score of KAP on anemia.

The findings of the present study reveal that there was no significant difference at mothers' educational status and the gain score level of knowledge, attitude and practice and the f values were calculated as 0.061, 1.066 and 0.241. Since, the calculated value is less than the p value; null hypothesis is rejected at the 0.05 level of significance with respect to attitude, practice and overall Score on KAP. Hence there is no significant difference between the mothers' educational status and gain score of attitude, practice and overall score.

Before the planned nutrition education programme nutrition education programme, the mean score of knowledge was 5.27 and the Standard deviation was 1.87, attitude mean score was 14.11 and the standard deviation was 3.67 and the mean score of practice was 6.99 and standard deviation was 1.71. After the planned Nutrition education programme, the mean score of knowledge was 8.22 and standard deviation was 1.18; attitude mean score was 30.33 and standard deviation was 3.65 and the practice mean score was 9.18 and standard deviation was 0.86. the above results shows that after the planned Nutrition education programme there was an increase in knowledge, attitude and practice of the menstrual hygiene among the adolescents girls.

There was a significant difference between the pre test and post test and the t values were calculated as 53.05, 89.59 and 37.26 and P value is less than 0.01. There is a significance difference in pre test and post test with respect to KAP on anemia. Based on the test, the mean scores of the post test are higher than the pre test scores because of the effectiveness of planned nutrition education programme.

Thus, the present study was undertaken to identify the learning needs of the adolescent girls with a view to develop and evaluate a planned nutrition education programme on anemia. It will help them to improve their self care ability and follow healthy and nutritious dietary practice. These variations can be attributed to various factors such as difference in socio - economic status and literacy status of the girls. It reveals the mean score of attitude on anemia of adolescent girls is 14.11 with SD of 3.67. The strategies for creating awareness through the planned

nutrition education programme would minimize the complication and unwanted outcome.

Knowledge by itself does not guarantee the adoption of healthy dietary behavior. A change in belief and attitude will also lead to healthy life style.

The Multiple Correlation co-efficient 0.338 measures the degree of relationship between the actual values and the predicted values of KAP gain score.

The results reveals regression analysis of knowledge, attitude and practice with related background variables among adolescent girls and it was found that there was a significant relationship with mothers educational status, age of menarche, age group (in years) and consumption of green leafy vegetables, personal hygiene at the level of $p < 0.05$ with a 'r' value of 0.016, 0.019, 0.02 and 0.49 respectively.

The planned nutrition education programme was found to be effective teaching strategy. This was evident through the findings of the post test mean knowledge score of group which is significantly higher than that of the pre-test score.

In the above context, it is stated that girl students spend most of their time at school and colleges therefore, teachers should receive specific skills during the ongoing teaching to spread the information on eat right to stay healthy to their young students. Education is the single most effective method that will decrease the rate of absence from school and prevent reproductive health diseases.

Conclusion

Present study revealed adolescents girls are prone to anemia due to lack of proper information regarding dietary habits. Socio economic strata like age, family income, mother's educational status, types of family, age at menarche, consumption of green leafy vegetables personal hygiene are also influence the anemic status of adolescent girls. So, Studies on creating awareness on consequences of anemia in all strata of the society, awareness programmes for enhancing female literacy should be taken up by the researcher. Periodic surveys should be done in schools on anemia for updating prevalence and promoting awareness among adolescent girls on nutritional principles on health. Health programs for students on utilization of easily available and affordable iron rich diet and forming kitchen garden etc. Educating parents and children about the importance of de-worming and emphasize them to have de wormed once in six months. Parents as well as teachers should be sensitized on micronutrient malnutrition, role of healthy diet and consequences of anemia. In-depth studies can be done on evaluation of iron indicators like serum ferritin, serum transferrin

etc. along with stool examination in larger sample size. Popularization of iron rich recipes among the masses through mass media and other modes of nutrition education should be done. Steps towards effective nutrition education programmes through government of India schemes to the population at large will be fruitful in reducing anemia in the society.

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